



Department of Earth and Environmental Sciences

## NGEN18, Physical Geography and Ecosystem Science: Statistical Tools for Climate and Atmospheric Science, 5 credits

*Naturgeografi och ekosystemvetenskap: Statistiska verktyg för klimat- och  
atmosfärsvetenskap, 5 högskolepoäng*  
Second Cycle / Avancerad nivå

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### Details of approval

The syllabus was approved by Study programmes board, Faculty of Science on 2020-12-08. The syllabus comes into effect 2020-12-08 and is valid from the autumn semester 2021.

### General information

The course is a compulsory course for second-cycle qualification in the specialisation "Nordic master's programme in environmental changes at higher latitudes" (EnCHiL). The course is given in collaboration with the partner universities that is included in the nordic cooperation. The course is given with teaching both at distance and on campus in Lund. The course is only available for students admitted to the specialisation "Nordic master's programme in environmental changes at higher latitudes".

*Language of instruction:* English

*Main field of study*

Physical Geography and  
Ecosystem Science

*Specialisation*

A1N, Second cycle, has only first-cycle course/s as  
entry requirements

### Learning outcomes

The aim of the course is to give the student knowledge of statistical tools that are used to be able to understand and solve relevant problems in the framework of the specialisation. Apart from an understanding of different statistical analytical methods the students learn how to justify the usability of different methods and how to present analyses in scientific reports.

### Knowledge and understanding

On completion of the course, the student shall be able to:

- Give an account of relevant open data sources and how to search and use such data
- Give an account of basic concepts in statistics e.g. variables, scales of measurement, distributions, central measures and dispersion measures
- Describe the most common methods in descriptive and inferential statistics and explain the meaning of correlation coefficients
- Give an account of different statistical hypothesis testing e.g. t-test, Chi Square tests, and their non-parametric alternatives
- Give an account of advanced statistical methods for data analysis e.g. bivariate and multivariate regression, variance and covariances analysis, linear and non-linear models, time series analysis and multivariate methods e.g. principal component analysis and different types of factor analysis.

### **Competence and skills**

On completion of the course, the student shall be able to:

- Carry out advanced statistical data analyses including time series analyses
- Use relevant statistical software packages to carry out different types of analyses
- Choose the most appropriate analytical method to solve prescribed problems.

### **Judgement and approach**

On completion of the course, the student shall be able to:

- Justify the usability and relevance of different methods
- Demonstrate the importance of a scientific approach to achieved results in an academic context
- Handle and present statistical results in a scientific context.

### **Course content**

The course is divided into thematic modules, that cover the learning objectives including knowledge about both basic descriptive statistical data analyses and more advanced statistical analysis of special relevance for atmospheric time series data.

### **Course design**

The course consists of lectures with connected exercises that mainly are given as distance learning. Furthermore, seminars are included on campus in Lund. The course is completed with a more extensive project work that is carried out in groups. Attendance at all teaching components except the lectures that consist of pre-recorded video is compulsory.

### **Assessment**

Examination takes place in writing in the form of exercise hand ins, project work and orally via seminars that are presented during the course. The students should also carry out a self-evaluation vis-à-vis the intended learning outcomes and contribute with peer reviews/discussions of result of the project work. For students who have not

passed the regular examination, additional occasion in close connection to this is offered.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

## **Grades**

Grading scale includes the grades: Fail, Pass, Pass with distinction

To pass the course it is required to have passed all written assignments and passed project work, and passed self-evaluation and peer reviews. The final grade is decided through a joint assessment of the results of the components adding to the examination and the project report in proportion to their extent (see appendix).

## **Entry requirements**

Entry to the course requires 90 credits in science or social sciences studies at university level.